BOSTON UNIVERSITY

GRADUATE JOURNAL

A Review of Current Graduate and Research Activities

April
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BOSTON UNIVERSITY

GRADUATE JOURNAL

A Review of Current Graduate and Research Activities

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Introducing the GRADUATE JOURNAL

READERS OF OUR FIRST ISSUE are bound to raise at least one question: "What need," they will ask, "brings the JOURNAL into existence? What need, what purpose, does the JOURNAL hope to fulfill?"

The JOURNAL exists to solve an important problem of communication.

At best, a university is a loosely knit organization of individuals and groups, and Boston University is no exception to this generalization. A certain degree of coherence and a certain unanimity of purpose do prevail in each of the Schools and Colleges within the University; this coherence and this unanimity result in each instance from devotion to a particular curriculum and from the unity of a particular administrative organization. Interchange of information is thus relatively easy and effective within any one School or College; and it is even easier, of course, within any single department of instruction.

But the problem of communication becomes acute when we turn to the areas of research and graduate training. These are vital areas in the life and work of the University; but here no framework of curriculum and no pattern of organization facilitate interchange of information. Beyond our specialties, few of us know what is happening throughout the University. Time and time again we are amazed to learn, purely by chance, of an active program of research or of a novel graduate training program going on in a department other than our own. Our lack of facilities for communicating information about research and graduate education within our own University has been the subject of concern and discussion in many of our groups in recent years and more particularly in recent months.

The BOSTON UNIVERSITY GRADUATE JOURNAL is, then, an instrument intended to improve our internal lines of communication in the fields of research, scholarly activities, and graduate education. The JOURNAL, to be published by the University administration and edited by the Graduate School, will appear ten times a year, monthly except July and August. It

will be distributed to regular members of the faculty, to administrators, and to trustees of the University. Through the libraries, departmental offices, dormitories, and lounges, we hope it will come into the hands of many students who are interested in learning of the diverse educational, scholarly, and service activities of the University. Limited distribution of the JOURNAL will also be made to administrators of other graduate and professional schools, to foundations concerned with higher education and research, and to interested friends of the University.

Although the JOURNAL is modestly conceived, it will deal with many aspects of research and graduate education in the University. Some features will appear regularly; others will appear intermittently when timely. Over the course of a year we can expect to find in the JOURNAL editorials on current and long-range problems in graduate education or in research; articles on unusual and especially interesting projects of graduate students in many fields; descriptions of significant research, instructional, or service programs; suggestions by faculty members and others about opportunities for team-approaches to research or to instructional problems in any one discipline or in a combination of disciplines; announcements of fellowships, scholarships, and other appointments available; examples of cooperative work involving the University and community agencies and enterprises; announcements of forthcoming lectures, institutes, meetings, and colloquia likely to interest readers of the JOURNAL; re-printings of brief published articles or notes dealing with research or graduate education and deserving broader circulation within the University; statistics of various kinds; reports of administrative and faculty actions having a bearing on graduate work in the University.

Readers are invited to send letters, notes, articles, and announcements which the editor may include in the JOURNAL as time and space permit. Suggestions from the readers and active cooperation of all members of the University community will go far toward insuring the success of the JOURNAL in fulfilling its mission.

This opening editorial would not be complete without acknowledgment of our indebtedness to the *Graduate School Record,* a publication of the Graduate School of the Ohio State University. Now in its fifth year, it is, as far as we know, unique in its field. From the beginning, it has inspired and stimulated hopes for this JOURNAL.

This publication is launched with the modest expectation that it will serve as a medium of communication among members of the faculty, the students, and the community in matters concerning the educational and scholarly activities of the University; as a mechanism for aiding the unification of interest in the diverse kinds of graduate and research undertakings; and as a means of promoting the implementation of the objectives of any true university: education, research, and service to the community. To these ends the JOURNAL is committed.

CHESTER M. ALTER
Dean of the Graduate School

Machines and Research

JOHN E. ALMAN
Director of the Office of Statistical and Research Services

The history of research in the past two decades shows a startling growth in the extent to which automatic computing and tabulating equipment has become a necessary tool for the research worker. The headlines have been caught in the past few years by the large-scale electronic computers; however, from considerations of cost and efficiency these are usually not available to any but sizeable and high-priority studies. A large portion of the research projects carried on in industry and universities cannot efficiently use these large-scale machines, yet have their own needs on a smaller scale. These needs are being met through the use of punched card equipment of the kind currently in use in Boston University's Office of Statistical and Research Services.

Punched card techniques were originated in the decade prior to 1890 by Dr. Herman Hollerith of the United States Bureau of the Census. He recognized that the rapid growth of the country as well as the added complexity of the decennial census made it probable that the census of 1900 would roll around before that of 1890 could be completed by the manual methods then in use. The punched card he devised has not changed substantially to this day, though the early tabulating equipment was slow and extremely limited when judged by present-day standards. The effectiveness of this new technique was amply demonstrated by the fact that the census of 1880, manually tabulated, took seven and a half years to complete; the census of 1890, the first to use tabulation from punched cards, was completed in about two and a half years.

The success encountered in the census tabulation encouraged businessmen to investigate the possibilities of the use of punched card tabulating equipment. The pioneer use in business was by the New York Central Railroad for the purpose of compiling freight statistics. Other companies adopted the technique for sales and cost analyses. Insurance companies, in particular, were among the first to mechanize their record-keeping procedures. As know-how and machines improved, the methods were applied to all phases of business accounting. With the growth of statistical applications, the need arose for machines that carry out the operations of multiplication and division as well as addition and subtraction. The development of punched card computers, started in the 1930's, was given a big impetus by the technical developments of World War II, and today several different models are available to carry out all the operations of arithmetic in sequential fashion. Both the medium-speed electric and some high-speed electronic punched card calculators are available at costs within the reach of relatively small businesses and institutions.

The chief advantages of punched card analysis of data are found in the savings of time and cost, savings which increase in proportion to the magnitude of the job. Indeed, many

studies that would never be warranted by manual methods can be handled economically by means of punched cards. A subtler form of saving comes from the increased accuracy of punched card tabulations and computations. This increased accuracy stems from three sources: (1) automatic transcription of results into tabular form, (2) lessened dependence on the alertness and skill of a human operator, and (3) the use the many automatic checking features provided by these machines.

The development and manufacture of punched card equipment in the United States is done by two companies, International Business Machines and Remington-Rand. Both companies manufacture a variety of machines for business accounting and statistical tabulation as well as electronic digital computers. For the types of tabulation and computation required in scientific research the IBM machines have by far the widest use.

The Office of Statistical and Research Services of Boston University has a well-rounded installation of International Business Machines equipment including the card calculating punch. The Office handles a variety of work for the University, including student registration and test processing. An additional function of the Office is to provide statistical and computational services for research projects carried on by University personnel. In particular, the services are available to graduate students working on research projects forming part of their programs for advanced degrees. Consulting in the field of applied statistics is available to graduate students and staff of the University, as well as the machine processing of data from research studies.

As a community service the Office offers its facilities to other institutions and agencies engaged in research projects. This aspect of the work has grown considerably in the past few years and is expected to expand even more in the future. The Office provides the same consulting service that is available to University personnel, and can act as a central agency for utilizing specialists within the University as consultants on specific problems brought in from outside agencies.

The types of projects for which the resources of this Office can facilitate the analysis of data include the following:

1. Statistical analysis of data from surveys using questionnaires or interviews. From original records the data are punched into cards, and the machines tabulate the frequency of the various kinds of responses in the form of printed tables. The use of the punched card allows a wide variety in the grouping of the respondents for tabulating purposes, as well as permitting the cross-tabulation of one response against another.

2. For projects involving mental or physical measurements, the cards can be used to prepare frequency distributions and percentile equivalents and to compute means, variances, and correlations. Problems involving the solution of simultaneous linear equations and matrix multiplication can be handled on a moderate scale, as can many iterative procedures. These operations are applicable to a host of projects in the areas of multivariate analysis—multiple regression, discriminant functions, and factor analysis.

3. For educational institutions and other agencies employing standardized tests, the Office offers machine scoring and item analysis services. Within the University, scoring is done for the Admissions and Guidance Testing Programs, and mid-term and final examinations for many courses are machine scored.

One of the drawbacks of punched card equipment is the low efficiency on very small jobs. Too often the set-up time so far exceeds the operating time that the cost is out of proportion to the results. To make small card-volume jobs feasible, permanently-wired set-ups for certain frequently used types of statistical analysis are maintained. For example, from two permanent set-ups it is possible to obtain the necessary accumulations for computing the Pearson product-moment correlation coefficient, with means and standard deviations as by-products. Costwise, this makes it possible to handle studies involving as few as 100 cases where otherwise the set-up time would be far out of proportion to the machine time. Other fixed set-ups yield frequency distributions and percentile equivalents, two-way frequency (contingency) tables, matrix multiplication and inversion.

As an indication of the volume of work that can be handled by a relatively small machine installation and staff, a summary of work done by the Office of Statistical and Research Services during 1951 is of interest.

1. For the Cooperative Testing Program conducted by the Office of School and College Relations of Boston University, a printed psychometric report was machine prepared on approximately 26,000 high school and junior high school students. This involved scoring about 170,000 tests, yielding about a half million separate scores. More than 2000 tables of frequency distributions and percentile equivalents were prepared from the punched cards.

2. The machine registration of students on the Commonwealth Avenue campus produced about 27,000 student registrations, or about 100,000 course registrations. Class lists, detailed lists of fees paid, and grade reports for each student were prepared on the machines. Grade point averages were computed for each undergraduate each semester, and a summary average and rank in class computed for the year on undergraduate males for the use of Selective Service. Statistical summaries of student enrollment, course loads, inter-school registrations, and a variety of miscellaneous summaries and listings were prepared as by-products of the basic registration cards.

3. Within the University approximately 9000 tests were scored for the Admissions and Guidance Testing Programs and, in some cases, tabulated reports were prepared from punched cards. About 25,000 classroom examinations were scored, and 35,000 tests were processed for other institutions and agencies. These three groups yielded about a quarter million separate scores.

4. Punched card analysis of data was made on some fifty research projects. These ranged over a wide field and required anywhere from an hour or so of machine time for the smallest job to several hundred machine hours for the largest.

The Office of Statistical and Research Services also maintains the University Computing Room, a workroom with tables and desk calculators for the use of faculty and students. Instruction in

the operation of the desk calculator, individually or in groups, is given by the staff of the Office.

During the current year the staff is participating in two courses of instruction in punched card methods. A Graduate School course in *Machine Methods* is offered for students who wish to acquire a working knowledge of the machines with emphasis on their utility for statistical analysis. Students are taught how to operate and set-up all machines, and they carry out assigned problems in a laboratory period. An Evening Division course, *Introduction to Punched Card Methods,* consists of lectures and demonstrations of the applications of the machines to accounting and statistical analysis; demonstrations on the machines are devised and conducted by the staff. Additional courses utilizing the equipment of the Office are expected to be offered in the next academic year.

A Cooperative Search for Universal Ethical Norms

Professor Edgar S. Brightman, Chairman of the Department of Philosophy, Boston University, is "honorary president for the Americas" of a unique international movement in democratic search of common human standards of conduct. The movement, called The International Society on Standards, has twin headquarters in Paris and Los Angeles.

The Society has just announced a novel course to be offered in 1952-53 at the University of Paris and open to scholars of all lands. This course will be based on a questionnaire which has brought answers from scholars of various countries and widely differing points of view.

The theory behind these activities is that in the common experience of mankind are implied certain universal standards of moral judgment which can be discovered when intelligent, freely inquiring minds work together in co-operative, democratic fashion. The Society's American letterhead carries as a motto the words of George Washington, "Let us raise a standard to which the wise and honest can repair."

The differences of moral judgment among various peoples have been heavily emphasized by recent anthropologists and have led many people to conclude that there are no true measures of right conduct. But the distinguished leaders of the International Society, such as André Lalande of the Sorbonne and Professor Brightman, think these differences are due in no small measure to the irrational acceptance of political, religious, and other authorities without clear-headed examination. They hope other universities will follow the University of Paris in searching for a common body of moral judgments acceptable to open-minded inquirers of any culture.

Those judgments, they point out, could become a rallying point for the free peoples of the world, as a more intelligent alternative to the artificially supported doctrines of totalitarianism.

L. Harold DeWolf
Professor of Systematic Theology

The Scholar and Documentation

ROBERT E. MOODY

Professor of History
Director of University Libraries and Museums

The increasing mass of material essential to scholars is such that few of them can hope to discover and to possess personally all the desired sources of information. Scholars, learned societies, and libraries have therefore interested themselves in the problem of maintaining control of the output of written records. Yet amazing as has been the progress in the making of catalogs, indexes, and bibliographies, the records have increased faster than the means of control. The pressing need has resulted in a new area of planning and research which is called "documentation."

Documentation is concerned with the creation, transmission, collection, classification, and use of recorded information in any form. Obviously this is a wide field. But its aim may be stated simply: to focus upon the total problem of the transmission of knowledge all the experience and insight which we have but which has previously been applied without coordination and in fragmentary ways. Its success will be measured by its effectiveness in serving the needs of the users of written records.

For the purpose of explaining the program of the "documentalists," let us assume that a written record has been made by an individual. (In fact the term document includes pictures and phonographic records.) The problem then becomes one of duplication and distribution. By and large, in spite of increasing costs, the great body of significant writing (along with much that is not) reaches the printed page, though not always promptly nor to best advantage. By existing processes, written records can be made available to users more quickly and effectively than many of them actually are. But to do this we have to overcome some of our inherited and acquired prejudices and adopt duplicating methods which in their present state of development are not so satisfying to the eye or to the author's ideas of prestige as the customary print and are less convenient and more tiring in the opinion of the user. Of these methods the offset process is making rapid progress. Photographs and photostats for duplication of a small number of copies are generally acceptable. Microfilm, microcard, and microprint have made some headway, but many scholars, both as authors and as readers, regard them dubiously.

The collecting of documents of which copies may be obtained is a task of great complexity. The publishers of printed materials issue printed catalogs and lists; the practice of copyright ensures that national libraries in each country get the great majority of books in print; the printed catalogs of great libraries like the Library of Congress and the British Museum are enormously helpful; the union catalogs on cards like that of the Library of Congress and the Bibliographical Center in Philadelphia enable much rare material to be located;

and of course special bibliographies, review journals, and the like exist for every field of learning. But obviously these tools, useful both to the librarian who collects and the scholar who uses (the two are not *necessarily* separate individuals), need to be overhauled in the interest of increasing coverage and coordination of effort. The list of agencies engaged in producing the tools of scholarship—abstracts, lists, bibliographies, indexes—, often in the same field, is so long as to indicate the necessity of more efficient organization. Only when this is done can the scholar and the library have under reasonable control the written records which civilization has produced.

The library and the scholar also must adapt to their use all those devices which will bring to them the records of which the existence and location have been determined but which can only with difficulty, if at all, be purchased in the market. The same duplicating processes which are available to the maker of the document may be used by the collector. Reproduction of the printed page, typescript, or microfilm can, with proper organization, be made available with increasing efficiency everywhere. Large masses of governmental records and long files of periodicals and newspapers are already available on microfilm, microcards, and microprint, and scholars must learn to use them. Other processes such as Thermo-fax, Stenafax, and Diazo-Copying will undoubtedly make it possible for libraries and individual scholars to get quickly inexpensive copies of documents.

The increase of the number of records and their adaptability in some instances and for some purposes to mechanical selection has resulted in experiments with punched cards. The use of such devices has been chiefly with business records and scientific information for which codes can be made with some ease. At the University of California information about commerce gleaned from customs records has been coded and placed on cards. The mechanical selector can therefore easily provide complete information on any one of many topics. The statisticians and most scientists are aware of the use of mechanical devices in their fields, but the many problems in the social sciences could be attacked more readily if problems of classifying information on cards could be solved.

The documentalists hope that their coordinated efforts to provide controls for records may make it possible to discover many new relationships between fields of scholarship which have tended to become isolated because of increased specialization. In any case, they are attacking the problems relating to the present confusion in the organization of documents. A number of scholars, many organizations, and several journals have made documentation their special concern. While often working on individual phases of the several major problems, they have united to pool their results.

To this end, the learned societies of the United States have set up the American Documentation Institute, which publishes *American Documentation* (see vol. II, no. 2, April, 1951, for a list of members). A similar English group is called Aslib and publishes the *Journal of Documentation*. An international organization known as FID (Fédération Internationale de Documentation) has its *Review of Documentation*. The articles and reviews in these publications bring together information from widely scattered fields and sources which show the trends of contemporary thinking on the vital problem of record control.

Student Research

Geology

Mr. Robert H. Moench prepared for college at the Cambridge School, Weston. He served in the Navy until August, 1946. He was graduated from Boston University, College of Liberal Arts, in 1950, with an A.B. degree *cum laude*. His sophomore year, 1947-1948, he spent at Montana State University, Missoula, Montana. He received his M.A. degree in Geology from Boston University Graduate School in January, 1951, and is at present a candidate there for the Ph.D. degree in Geology. His dissertation, on which he is working under the direction of Dr. C. Wroe Wolfe, Professor of Geology, treats of a geologic problem in northwest Maine.

In the past twenty years geologists have done much work in New Hampshire and in the Moosehead region of Maine. The northwest corner of Maine, however, situated between those two regions, is relatively unknown geologically. Hence arose the thought that this area might provide: first, a geologic link between the two widely removed known areas; second, much evidence pertaining to specific geologic problems; and third, evidence leading to a better understanding of the geologic history of northern New England. With this in mind, Mr. Moench chose for detailed investigation the Phillips Quadrangle, an area of about two hundred and twenty square miles.

There is no literature concerning the geology of the Phillips Quadrangle or the adjacent areas, and this investigation is therefore entirely original. The method of study involves both field and laboratory work. In the course of two field seasons (1950 and 1951), Mr. Moench mapped the geology upon a U. S. Geologic Survey topographic base map. He traversed the area via the ridges and streams, for in those places the bedrock is most likely to be exposed. In this manner the geology has been gradually pieced together.

In the laboratory Mr. Moench has made about three hundred thin sections of rock specimens from the area, and is studying them under the petrographic microscope to determine the mineralogical and probable chemical composition of the rocks, as well as to analyze their texture and fabric. Where this technique cannot identify certain minerals, other methods become useful. A mineral may be identified by its optical properties, specific gravity, and lattice dimensions (by x-ray powder photography). Some rocks, for instance, contain detrital garnets (deposited as garnet sand) which escaped recrystallization. The three mentioned criteria can identify the garnets accurately. Because a particular type of garnet is likely to be associated with a particular type of rock, much can be told about the rocks

from which they were derived. In several other rocks, bedding features which were not discernible in hand specimens were seen in thin section. This process facilitated the determination of the age relations between two successive formations. Other thin sections revealed two periods of deformation and the directions from which the forces originated.

The geologist's approach here is entirely empirical. Geologic processes are sought by means of description. The present stage of the investigation is mainly descriptive. Mr. Moench has found that there are two mappable sedimentary formations in the Phillips Quadrangle. These formations have been complexly folded, in places overturned, along axes that trend northeast. They have been extensively recrystallized and intruded by large bodies of plutonic rocks. The plutonic bodies are mainly conformable to the structural trends of the folded sedimentary rocks, though in places they are transgressive. Each pluton is surrounded by a zone of completely recrystallized country rock. These zones are extremely resistant to weathering; thus, they form the ridges and mountains of the area. The origin of the most prominent topographic features, it has been found, is a function of the depth to which erosion has penetrated into the plutons. The metamorphic zones immediately above the plutons form mountains; but when these zones are penetrated by erosion, an inversion of relief takes place, and the granite-pluton areas become topographic basins.

Numerous problems raised by this investigation are in various stages of solution, and some of them may never be solved. Because no fossils have been found, the age of the sedimentary rocks of the area is still unknown. There is question whether the plutonic rocks were formed by recrystallization of sediments in place, or intruded as magmas by assimilation of country rock, or intruded into the country rock by forcible injection. Field evidence points to the third possibility as the explanation. There is question concerning the relation between "regional" and "contact" metamorphism and the generation of magmas. It is possible that the heat body that caused the recrystallization of the sediments on a regional scale also caused the generation of magmas at a greater depth. These magmas, under the influence of the same lateral forces that folded the sediments, were then forcibly injected into the rocks above. As they crystallized, hot aqueous solutions escaped into the country rock and facilitated extreme recrystallization. The depth within the earth and the physico-chemical conditions that prevailed when all this took place are still another problem relevant to the investigation.

Pharmacology

Mr. Edward D. Swiss entered Rutgers University from the public schools of Elizabeth, New Jersey. He served in the Navy from May, 1945, through December, 1946. He received his B.S. degree in Biology from Rutgers in 1949 and his M.A. degree in Pharmacology from Boston University Graduate School in 1951. A Research Fellow in Pharmacology, he is currently a candidate at Boston University for two degrees: the M.D. degree in the School of Medicine and the Ph.D. degree in the Graduate School, Division of Medical Sciences. His doctoral dissertation is connected with a search for the mechanism of action of veratrum as an agent for lowering blood pressure. Dr. George L. Maison, Pro-

fessor of Pharmacology, is directing Mr. Swiss' research.

The alkaloids found in the roots and rhizomes of the liliaceous veratrum plant (the hellebores) have been known for years to possess potent blood pressure lowering (hypotensive) properties. It is only in recent years, however, that biological standardization of these substances in the dog has permitted an adequate evaluation of their properties. Clinical experience with these drugs has indicated their effectiveness after oral or intravenous administration; but the side action of nausea and vomiting has to some extent limited their use in lowering blood pressure. It has been demonstrated for most of the previously known veratrum compounds that a high correlation exists between the hypotensive dose and the amount required to produce vomiting. Investigation has therefore been directed at isolating from the various species of veratrum an alkaloid which has significant hypotensive properties and yet is less emetic than previously known veratrum compounds.

Six new ester alkaloids have been isolated from the several species of veratrum by the Department of Organic Chemistry, Riker Laboratories, Los Angeles, California. Mr. Swiss has tested these alkaloids for hypotensive properties by the dog assay method of Maison, Gotz, and Stutzman *(Journal of Pharmacology and Experimental Therapeutics,* 103 [1951], 74). Dosage of each alkaloid adequate to produce 30% fall of mean arterial pressure in anesthetized dogs was determined by intravenous infusions of 10 minute duration with comparison to a standard dose of reference powder (Veriloid at a dose of 1 microgm per kgm per min.) in the same animal. Doses in microgm per minute were: Alkaloid VB (veratrum viride) 0.256 (0.21-0.33); Alkaloid VFA (veratrum fimbriatum) 1.1 (0.95-1.4); Alkaloid VFB (veratrum fimbriatum) 0.12 (0.11-0.14); Alkaloid VFC (veratrum fimbriatum) 1.2 (0.9-1.7); Alkaloid VFD (veratrum fimbriatrum) 0.24 (0.19-0.32) and Alkaloid SAA (veratrum eschscholtzii) 0.42 (0.36-0.51). VFB M1 and VFB M2, methanolysis products of alkaloid VFB, had the following respective potencies: 0.36 (0.27-0.54) and 0.77 (0.46-2.3).

The dose required to produce emesis in 50% of the dogs tested by intravenous injection expressed as microgm per kgm are: VB 4.4 (3.3-5.8); VFB 2.8 (1.9-4.1); VFD 8.8 (7.5-10.2) and SAA 10.8 (8.7-13.4). When the values are corrected for differences in potency, they do not differ significantly from other veratrum derivatives which have been tested (Swiss, E. D., *Journal of Pharmacology and Experimental Therapeutics,* 104 [1952], 76). Thus these new alkaloids are no less emetic than the previously known veratrum compounds. The dose required to kill 50% of mice after intraperitoneal injection expressed as mgm per kgm were: VB 0.34 (0.25-0.4); VFB 0.22 (0.16-0.31); VFD 0.66 (0.54-0.81) and SAA 0.175 (0.06-0.5).

The availability of pure potent veratrum alkaloids is limited. Thus research is now being made for a synthetic compound which exhibits significant hypotensive potency; and Mr. Swiss' dissertation is concerned with the pharmacological features of the problem. Mr. Swiss has used the dog assay method to test a number of synthetic veratrum derivatives. The equipotent doses of these substances were all greater than 10 microgm per minute, indicating that none had significant hypotensive properties.

Research Project of the Faculty of the School of Theology

EDWIN P. BOOTH
Professor of Historical Theology

Object: To examine the present condition of the world as it relates itself to the message of the Church and particularly to the responsibility of a Faculty of Theology in providing direction and guidance to the Church.

In the same fashion as teams of scientists have been working of late years for the pursuit of truth, both abstract and applied, the Faculty of Theology of Boston University has been working for two years on an analysis of changing world problems and the relation of the areas and truths of religion to these problems.

The project had its inception when the Executive Secretary of the World Peace Commission of the Methodist Church discussed with Dean Walter G. Muelder the possibility of a seminary statement on *Christianity and Communism*. The Dean presented the matter to the faculty, and a guiding committee was appointed. It soon became apparent that the problem was infinitely broader than the original subject.

After several meetings of the faculty, breakdowns for functioning units of study were determined. It seemed that the entire area of Theology should be re-studied and its services to Society re-assessed. The main divisions of the field of Theology have been Historical, Biblical, Systematic, and Practical. To each of these departments then was assigned the task of discovering the main and essential messages in the respective areas. Committees were set up and assignments made to decide the areas of present world conflict and to analyze the proper approaches toward solution.

Individual faculty members prepared careful reports. There were, for example, reports on Communism, on the State, on History and Change, on Authority. Each such report was read to the faculty, and intensive criticism was applied. Papers on Penitence, on the Message of Jesus, on Cooperation in the World's New Universalism, and on Economic and Racial Tensions were presented and thoroughly reviewed.

The guiding committee then worked these into a statement of description and into propositions for spiritual and active participation in the world order now emerging.

This general statement was mimeographed and distributed to the faculty in advance of meetings and then thoroughly revised. Finally a draft was prepared by the chairman of the committee so that a fairly uniform style might be achieved from the many units independently prepared. This draft was then minutely discussed by the faculty and final approval given.

The process took two years to complete. Each member of the faculty was personally and continuously involved. Many beneficial results came from the experience. The steady pursuit of new truth entailed the surrender of many particularized points of view. It

greatly broadened the thought areas of each member involved. It opened new and optimistic views of the future. It inspired and brought new vigor to the corporate life of the faculty. It re-assessed inherited truths and saw visions of new applications of these truths, and it opened the way to a revived and vigorous theological contribution to the developing world scene. It was group or team research in the best sense of that term.

The paper itself is to be called:

Christian Faith and World Crisis: An Address to the Church by the Boston University Faculty of Theology.

It is being printed by the World Peace Commission of the Methodist Church and distributed throughout its leadership. Copies may be obtained after May the first at the Dean's office, 745 Commonwealth Avenue.

Announcements and Notes

May Meeting of the Graduate School Faculty

The Faculty of the Graduate School will be asked at its May meeting (exact time and place to be announced later) to consider a petition relative to the language requirements for the Ph.D. degree. The petition, dated January 31, 1952, reads as follows:

"There seems to be quite general agreement that one of the main purposes of the language requirements for Ph.D. candidates in the Sciences is to make sure that they have command of two languages as tools to be used in their research work, both present and future. In using such a tool, students and graduates have the advantage of the aid of a dictionary, and are therefore used to reading the language with a dictionary at hand. All of us, unless we are facile speakers of the language, continue to use a dictionary when reading foreign languages throughout our lifetime. Since the average graduate student in the Sciences is usually not an accomplished linguist, and since the language examinations are given by a language Department which demands rather meticulous accuracy in translations, it is the feeling of the undersigned that students should be allowed to use a dictionary during the language examinations. We feel that it is no more than fair to afford the student the privilege of this accessory tool (a dictionary) during his examination, because he certainly will have used it in all his foreign language readings for research purposes before the examination, and will continue to use it for research purposes throughout the remainder of his scientific career (unless by some chance he happens to become extremely adept in the language).

"We, the undersigned, request therefore that [Dean Alter] bring this matter to the attention of the Board of the Graduate School with a view to making the necessary changes in the regulations concerning language examinations which would allow examinees to use a dictionary during these examinations."

This petition was signed by twelve members of the faculty, two of whom, however, stipulated that the proposed dictionary examinations should be completed within a definite time limit.

On February 28, 1952, the Graduate School Board took the following action, as recorded in its minutes:

"A petition signed by twelve members of the faculty recommending the use of the dictionary during language examinations was considered. It was VOTED to refer this petition to the Faculty of the Graduate School with the recommendation that it be granted."

Department of Mathematics

Gottfried E. Noether, Assistant Professor of Mathematical Statistics, published in the December, 1951, issue of the *Annals of Mathematical Statistics* a short paper entitled "On a Connection between Confidence and Tolerance Limits." He is working now on the problem of the relative efficiency of two different tests of the same statistical hypothesis. It is not sufficient to know that a certain test is better than some other test. We should like also to know how much better it is since sometimes it may be profitable to use a test which, though slightly less efficient than another test, is much simpler to apply, leading to a saving in both time and work. On March 19, 1952, at a seminar in mathematical statistics held at Columbia University in New York City, Professor Noether presented some results of his research in his paper, "Asymptotic Relative Efficiency of Tests of Hypotheses."

Francis J. Scheid, Assistant Professor of Mathematics, as consultant for Air Force Cambridge Research Center, has been working most recently on certain fundamental concepts of communication theory, particularly on generalization of the notion of uncertainty and on the relation between uncertainty, information, and surprise. His own academic interest has recently been concentrated on the numerical solution of partial differential equations by finite difference methods, particularly non-linear parabolic equations.

Record of Research

Beginning with the May issue, the JOURNAL will begin listing the research papers and books published by members of the University staff. The source for this record will be the collection of offprints and books sent by their writers to the President's office. Those who for one reason or another have no offprints at hand are urged to put the pertinent bibliographical data on cards (3 x 5) and send them to the President's office.